



Shell Oil Company
Interoffice Memorandum

OCTOBER 9, 1980

FROM: GEOLOGIST, ENVIRONMENTAL AFFAIRS, HS&ES
TO: MANAGER PROCESS AND PROJECT ENGINEERING-WOOD RIVER REFINERY
SUBJECT: PIEZOMETER INSTALLATION - WOOD RIVER REFINERY

A groundwater monitoring program has been devised for the old fly ash pond area. The program will consist of drilling 12 holes with two piezometers installed per hole. Piezometers will be set at varying elevations so that aquifer equipotential and water quality can be determined for the entire saturated thickness. Typical prognostic diagrams are attached.

Materials

All piezometers will consist of two inch, Schedule 80, threaded-flush joint, PVC pipe. Each piezometer will have a two foot slotted (0.020 inch slots) portion. The lower piezometer in each hole will have two ten-foot sections with four three-inch centralizers installed on each section. A three-inch spacer will be used to keep the two piezometers separated. The centralizers and spacer will ensure a good seal. Pelletized bentonite will be used to provide the clay seal. A clean washed, coarse sand (blasting type) and #2 pea gravel mixture will be used for the gravel pack. The sand bridge will consist of a clean washed mixture of medium to fine sand. A two inch Schedule 80 PVC pipe will be used for seal and pack emplacement, while a three inch Schedule 80 PVC pipe will be used for grout emplacement.

Installation Procedures

- 1) Determine the sampling elevations (two per hole, approximately 11 feet apart).
- 2) Drill a 12-inch hole to a depth of two feet below the lowest sampling elevation.



- 3) Concurrent with drilling, have the bottom piezometer assembled as follows:

Bottom Portion

well point + 2 foot slotted + 10 foot blank with centralizers + 10 foot blank with centralizers.

Upper Portion

The remainder of the piezometer will consist of 20 foot blank sections until the surface has been reached. Appropriate length, blank sections can be added to give the piezometer an elevation of approximately three feet above grade.

- 4) Lower the pipe into the hole (adding sections as lowered) so that the slotted portion is at the appropriate elevation, making sure that the centralizers are against the hole wall.
- 5)
- a) Emplace the gravel pack so that the mixture is one foot above the slotted portion of the pipe.
 - b) Emplace a one foot sand bridge above the gravel pack.
 - c) Emplace bentonite pellets for a thickness of five feet above the sand bridge.
 - d) Emplace a one foot sand pack.
- 6) Concurrent with the operations of 5) above, assemble the second piezometer as follows:

Bottom Portion

well point + 2 foot slotted + 10 foot blank with spacer

Upper Portion

As in Part 3-Upper Portion.

- 7) Attach the spacer to the piezometer and let the other end ride down over the piezometer already in place, lowering the pipe until the slotted portion is at the appropriate elevation.
- 8)
- a) As in Part 5(a).
 - b) Emplace a two foot sand bridge above the gravel pack.
 - c) Emplace grout to the surface.

9) Install security measures as needed.

We believe that it will be necessary for us to provide on-site supervision for installation of the first few piezometers, ensuring that proper emplacement procedures are met. We will be pleased to assist in acquiring the proper equipment as described herein.

C. C. Stanley

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PIEZOMETER INSTALLATION - Wood River Refinery

Plan View



